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<b>TRANSMITTAL FORM</b>  <small>(to be used for all correspondence after initial filing)</small>		Application Number	10/700,144 <i>704 1976</i>
		Filing Date	November 3, 2003
		First Named Inventor	Mark A. Neil
		Art Unit	2881
		Examiner Name	Vanore, David A.
Total Number of Pages in This Submission	17	Attorney Docket Number	10011.002300 (P1240)

ENCLOSURES (check all that apply)		
<input type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment / Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/ Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): <small>Request for Certificate of Correction; PTO Form SB-44 (in duplicate); Exhibit A &amp; B; Return Receipt Postcard</small>
<b>Remarks</b>		

*Certificate JUN 06 2006*

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT			
Firm	OKAMOTO & BENEDICTO LLP		
Signature	<i>James K. Okamoto</i>		
Printed Name	James K. Okamoto		
Date	May 26, 2006	Reg. No.	40,110

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Signature	<i>James K. Okamoto</i>		
Typed or printed name	James K. Okamoto	Date	May 26, 2006

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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*JUN 6 2006*



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants(s): Neil, et al.

Patent No.: 7,041,976

Issue Date: May 9, 2006

Serial No.: 10/700,144

Filing Date: November 3, 2003

Title: Automated Focusing of Electron Image

Atty. Docket No.: 10011.002300 (P1240)

Attn: Certificate of Correction Branch  
Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

REQUEST FOR CERTIFICATE OF CORRECTION

Sir:

The Following errors, as more fully described below, appear in this patent.

The Applicant submits that no fee is due for correction of the errors made by the Patent and Trademark Office; OR,

The errors occurred in good faith. Correction thereof does not involve such changes in the patent as would constitute new matter or would require re-examination. A Certificate of Correction is requested. Enclosed herewith is payment in the amount of \$\_\_\_\_\_ to cover the fee for this Certificate of Correction.

Attached hereto are duplicate Forms PTO/SB/44, with at least one copy that is suitable for printing.

Applicants kindly request the following changes:

a. Please delete the following Inventors:

Gabor D. Toth, San Jose, CA (US);

Varoujan Chakarian, Fremont, CA (US)

Douglas K. Masnaghetti, San Jose, CA (US)

b. Issued claim 9, which was claim 22 during prosecution, should read:

The system of claim 8, wherein, in order to maintain the focus of the electron image, the control means is further configured to increase the stage bias voltage when the energy-filter cut-off voltage decreases, and to decrease the stage bias voltage when the energy-filter cut-off voltage increases.

c. Issued claim 10, which was claim 23 during prosecution, should read:

The system of claim 8, wherein, in order to maintain the focus of the electron image, the control means is further configured to increase the stage bias voltage by a same voltage amount as the energy-filter cut-off voltage decreases, and to decrease the stage bias voltage by a same voltage amount as the energy-filter cut-off voltage increases.

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JUN 6 2001

A copy of the office communication dated March 30, 2006 approving the change of inventorship is submitted herewith as Exhibit A.

Also submitted herewith is a copy of the Response to Final Office Action filed on August 2, 2005 and marked as Exhibit B. Exhibit B shows the language of then claims 22 and 23 (now issued claims 9 and 10) as last amended prior to allowance.

Please send the Certificate to:

James K. Okamoto  
Okamoto & Benedicto LLP  
P.O. Box 641330  
San Jose, CA 95164-1330

Respectfully submitted,  
Mark A. Neil, et al.

Dated: May 26, 2006

By: J. K. Ok

James K. Okamoto, Reg No. 40,110  
Attorney For Applicant(s)  
OKAMOTO & BENEDICTO LLP  
PH: (408) 436-2110  
FAX: (408) 436-2114

Enclosure(s)

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Signature:	<u>J. K. Ok</u>		
Typed or Printed Name:	James K. Okamoto	Dated:	5/26/2006
Express Mail Mailing Number (optional):			

JUN 5 2006

# UNITED STATES PATENT AND TRADEMARK OFFICE

## CERTIFICATE OF CORRECTION

PATENT NO : 7,041,976

Page 1 of 1

APPLICATION NO. : 10/700,144

ISSUE DATE : May 9, 2006

INVENTOR(S) : Neil, et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

on front page, under inventors, delete

– Gabor D. Toth, San Jose, CA (US); Varoujan Chakarian, Fremont, CA (US); Douglas K. Masnaghetti, San Jose, CA (US) –

on column 9, line 2, after "stage bias voltage", delete

– is decreased –

on column 10, line 3, after "stage bias voltage", delete

– is –

MAILING ADDRESS OF SENDER (Please do not use customer number below):

OKAMOTO & BENEDICTO LLP  
P.O. BOX 641330  
SAN JOSE, CA 95164-1330

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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JUN 6 2006

# UNITED STATES PATENT AND TRADEMARK OFFICE

## CERTIFICATE OF CORRECTION

PATENT NO : 7,041,976

Page 1 of 1

APPLICATION NO. : 10/700,144

ISSUE DATE : May 9, 2006

INVENTOR(S) : Neil, et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

on front page, under inventors, delete

– Gabor D. Toth, San Jose, CA (US); Varoujan Chakarian, Fremont, CA (US); Douglas K. Masnaghetti, San Jose, CA (US) –

on column 9, line 2, after "stage bias voltage", delete

– is decreased –

on column 10, line 3, after "stage bias voltage", delete

-- is --

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Exhibit A



APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
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EXAMINER

ART UNIT	PAPER
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033006

DATE MAILED:

**Please find below and/or attached an Office communication concerning this application or proceeding.**

Commissioner for Patents

Applicant has requested a change of inventorship under 37 CFR 1.48(b) where Gabor D. Toth, Varoujan Chakarian, and Doug Masnaghetti are not inventors of the allowed claims. This inventorship change was the result of amendments to, or cancellation of, claims during prosecution of the application. The applicant has provided a request signed by a party set forth in 37 CFR 1.33(b) and provided the required fee required in 37 CFR 1.17(i).

The request to change inventorship is approved.

The inventors of the instant application are Mark A. Neil and Gian Francesco Lorusso.



3/30/06  
David A. Vanore  
Patent Examiner  
Art Unit: 2881



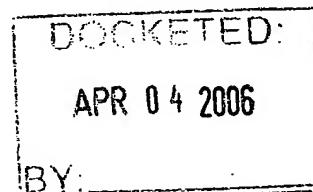
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/700,144	11/03/2003	Mark A. Neil	10011.002300 (P1240)	3845
31894	7590	03/31/2006	EXAMINER	
OKAMOTO & BENEDICTO, LLP			VANORE, DAVID A	
P.O. BOX 641330			ART UNIT	PAPER NUMBER
SAN JOSE, CA 95164			2881	

DATE MAILED: 03/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.



JUN 6 2006

Docket No. 10011.002300 (P1240)  
Response To Final Office Action  
August 2, 2005

Exhibit B

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

Mark A. Neil, et al.

Application No. 10/700,144

Examiner: Gurzo, Paul M

Filing Date: November 3, 2003

Art Unit: 2881

Title: Automated Focusing of Electron Image

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Honorable Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**RESPONSE TO FINAL OFFICE ACTION**

Sir:

This submission is responsive to the Final Office Action mailed on June 2, 2005.

JUN 6 2005

AMENDMENT TO THE CLAIMS

1. (currently amended): A method for automated focusing of an electron image in an electron imaging system, the method comprising:

selecting an area on which to focus and impinging an electron beam over the area;

~~monitoring an energy filter cut-off voltage during electron imaging of a substrate;~~

measuring an average intensity of detected electrons over a range of filter bias voltages so as to determine an energy filter cut-off voltage; and

adjusting a stage bias voltage setting an operating condition of the electron imaging system in negative correspondence with based on the energy-filter cut-off voltage so as to maintain a focus of the electron image put the electron image into focus without needing to determine a sharpness or contrast of the electron image.

2. (currently amended): The method of claim 1, wherein the operating condition comprises a stage bias voltage, and wherein, in order to maintain the focus of the electron image, the stage bias voltage is increased when the energy-filter cut-off voltage decreases, and the stage bias voltage is decreased when the energy-filter cut-off voltage increases.

3. (currently amended): The method of claim 1, wherein the operating condition comprises a stage bias voltage, and wherein, in order to maintain the focus of the electron image, the stage bias voltage is increased by a same voltage amount as the energy-filter cut-off voltage decreases, and the stage bias voltage is

JUN 6 2006

decreased by a same voltage amount as the energy-filter cut-off voltage increases.

4. (currently amended): The method of claim 1, ~~wherein, instead of adjusting the stage bias voltage, wherein the operating condition comprises~~ a strength of an objective lens ~~is adjusted~~.

5. (currently amended): The method of claim 1, ~~wherein, instead of adjusting the stage bias voltage, wherein the operating condition comprises~~ a strength of an extraction field ~~is adjusted~~.

6. (currently amended): The method of claim 1, wherein, instead of adjusting the stage bias voltage, a strength of a source voltage level is adjusted.

7. (currently amended): The method of claim 1, wherein said ~~adjusting putting the electron beam in focus without needing to determine the sharpness or contrast of the electron image~~ provides for rough focusing of the electron image, and further comprising using a contrast-based focusing procedure for fine focusing of the electron image.

Claims 8-10. (canceled):

11. (currently amended): A system for automated focusing of an electron image in an electron beam inspection apparatus, the apparatus including an autofocusing means that comprises: system comprising:  
means for selecting an area on which to focus and for impinging an electron beam over the area;

~~means for monitoring an energy filter cut-off voltage during electron imaging of a substrate~~ measuring an average intensity of detected electrons over a range of filter bias voltages so as to determine an energy filter cut-off voltage; and

control means for adjusting configured to set a stage bias voltage of the electron beam inspection apparatus ~~in negative correspondence with~~ based on the energy-filter cut-off voltage so as to maintain ~~a focus of an electron image~~ put the electron image into focus without needing to determine a sharpness or contrast of the electron image.

Claims 12-21. (canceled)

22. (currently amended) The apparatus system of claim 11, wherein, in order to maintain the focus of the electron image, the control means is further configured to increase the stage bias voltage ~~is increased~~ when the energy-filter cut-off voltage decreases, and to decrease the stage bias voltage ~~is decreased~~ when the energy-filter cut-off voltage increases.

23. (currently amended) The apparatus system of claim 11, wherein, in order to maintain the focus of the electron image, the control means is further configured to increase the stage bias voltage ~~is increased~~ by a same voltage amount as the energy-filter cut-off voltage decreases, and to decrease the stage bias voltage ~~is decreased~~ by a same voltage amount as the energy-filter cut-off voltage increases.

REMARKS

Claims 1-7, 11, and 22-23 remain in the present application. Claims 8-10, 12-19, and 20-21 were previously cancelled without prejudice. Claims 1-7, 11, and 22-23 are hereby amended. No new matter is being added.

Claims Rejections

Claims 1-7, 11 and 22-23 are rejected under 35 USC 103(e) as being unpatentable over Lo et al. (US Patent 6,566,897). Applicants respectfully traverse this rejection with respect to the claims as now amended.

Claim 1, as amended, now recites as follows.

1. A method for automated focusing of an electron image in an electron imaging system, the method comprising:
  - selecting an area on which to focus and impinging an electron beam over the area;
  - measuring an **average** intensity of detected electrons over a range of filter bias voltages so as to determine an energy filter cut-off voltage; and
  - setting an operating condition of the electron imaging system **based on the energy-filter cut-off voltage** so as to put the electron image into focus **without needing to determine a sharpness or contrast of the electron image**.

(Emphasis added.)

As recited in amended claim 1, after selecting an area on which to focus, an **average** intensity of detected electrons is measured over a range of filter bias voltages so as to determine an energy filter cut-off voltage. Then, an operating condition is set **based on the energy filter cut-off voltage** so as to focus the image **without needing to determine the sharpness or contrast of the electron image**.

JUN 6 2005  
G. L. U. U. B.

Claim 1, as amended, is supported, for example, in FIG. 3 of the present application and the description relating thereto. For convenience, FIG. 3 is reproduced below.

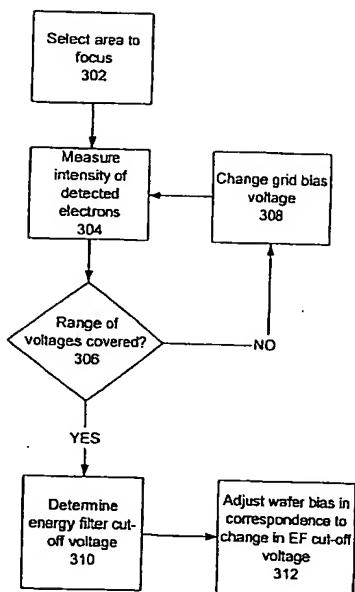


FIG. 3

As recited in the original specification, “Advantageously, using this method, the area selected does not require the amount of feature detail required by the conventional auto-focusing procedure. This is because the method **does not rely on contrast-based focusing.**” (Specification, page 5, lines 17-20, emphasis added.) “Instead, the method measures and utilizes an **average** detected intensity and **can even focus on a bare wafer without an image pattern.**” (Specification, page 12, lines 10-12, emphasis added.)

Lo et al. pertains to a “Voltage Contrast Method and Apparatus for Semiconductor Inspection Using Low Voltage Particle Beam.” According to Lo et al, “Prior to imaging an area of the substrate, the tool **charges an area surrounding the image area** to eliminate or reduce the effects caused by

assymmetrical charging in the surrounding area. ... The result is a highly uniform image with **improved contrast** for accurate defect detection." (Lo et al, Abstract, emphasis added.) As such, Lo et al. pertains to charging a surrounding area to improve contrast in voltage contrast images. In voltage contrast images, differences in voltages on different surface features produce contrast between the features.

In comparison to Lo et al., the claimed invention pertains to a method of focusing an area "**without needing to determine a sharpness or contrast of the electron image.**" In fact, as stated above, "the method measures and utilizes an **average** detected intensity and **can even focus on a bare wafer without an image pattern.**" (Specification, page 12, lines 10-12. emphasis added.) In other words, the claimed invention "blindly" focuses the image without a need for any features or contrast in the image. Hence, the claimed invention is very distinctive over the teachings of Lo et al.

Regarding focusing, the system in Lo et al. is described as merely having "Conventional software ... for functions such as ... auto-focus ...." (Lo et al., Column 8, lines 36-39.) Such a conventional procedure for auto-focusing is described in relation to FIG. 2 of the present application and involves selecting an area having sufficient feature detail and determining a sharpest image of that area.

For at least the above-discussed reasons, applicants respectfully submit that claim 1 is patentably distinguished over the cited reference.

Claims 2-7 depend from claim 1. As such, for at least the reasons discussed above in relation to claim 1, claims 2-7 are also patentably distinct over the cited reference.

Claim 11, as amended, now recites as follows.

11. A system for automated focusing of an electron image in an electron beam inspection apparatus, the system comprising:  
means for selecting an area on which to focus and for impinging an electron beam over the area;  
means for measuring an **average** intensity of detected electrons over a range of filter bias voltages so as to determine an energy filter cut-off voltage; and  
control means configured to set a stage bias voltage of the electron beam inspection apparatus **based on the energy-filter cut-off voltage** so as to put the electron image into focus **without needing to determine a sharpness or contrast of the electron image.**

For at least the reasons discussed above in relation to claim 1, claim 11 is also patentably distinct over the cited reference.

Claims 22-23 depend from claim 11. For at least the reasons discussed above in relation to claim 11, claims 22-23 are also patentably distinct over the cited reference.

Docket No. 10011.002300 (P1240)  
Response To Final Office Action  
August 2, 2005

Conclusion

Applicants respectfully submit that claims 1-7, 11 and 22-23, as amended, are now in patentable form. Favorable action is respectfully requested.

Respectfully submitted,  
Mark A. Neil, et al.

Dated: August 2, 2005

By: J. K. A.  
James K. Okamoto, Reg. No. 40,110

Okamoto & Benedicto LLP  
P.O. Box 641330  
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Signature:	<u>J. K. A.</u>		
Typed or Printed Name:	James K. Okamoto	Dated:	August 2, 2005

1000 8/2005